

Place	Date	Time	Width of path	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
			<i>Yards</i>					
Morrellville and Estherville and vicinity, Pa.	21	P. m.				Heavy hail	Numerous windows broken; considerable damage to growing crops.	Official, U. S. Weather Bureau.
Rock and Walworth Counties, Wis.	21				\$10,000	do.	Tobacco and corn crops severely damaged.	Do.
Hall, N. Y.	23		1,760		20,000	do.	Fruits badly injured; cabbage and peas totally ruined; other crops damaged; path 2½ miles long.	Do.
Nodaway County, Mo.	24	5-6 p. m.			70,000	Severe hail, wind, and rain.	10,000 acres of crops damaged; 2,000 total loss.	Do.
Iowa (western).	24	P. m.				Hail and wind.	Extensive crop losses.	Do.
Emporia, Kans. (near)	25	3 p. m.	12 mi.		50,000	Heavy hail.	Crops devastated over area 12 miles square; 2,500 panes of glass broken.	Do.
Delmar, N. Y., and vicinity.	27	2 p. m.	880		6,000	do.	Considerable damage to truck gardens and greenhouses; path 2½ miles long.	Do.
Pigeon Falls, Wis.	27	3:30 p. m.	1-3 mi.		10,000	Hail and electrical.	Much damage to crops; large barn destroyed by lightning.	Do.
Iowa (northern).	27	P. m.				Hail and wind.	Many thousands of dollars damage to crops and buildings.	Do.
Port Huron, Mich. (near)	27				15,000	Electrical.	2 large barns and contents, including livestock, burned.	Do.
St. Paul and Minneapolis, Minn.	27					Severe wind.	A number of small buildings damaged; telephone service impaired; several persons injured.	Do.
Arcadia, Wis.	28	4 p. m.	880		9,000	High wind.	Damage chiefly to crops.	Do.
Caldwell, Kans., and vicinity.	28	4:40 p. m.				Small tornado.	Many trees torn up; autos damaged; several buildings unroofed; electric service demoralized.	The Wichita Eagle (Kans.).
Monrovia, Kans., to Kansas City, Mo.	28	4:45 p. m.			25,000	Tornado.	4 small houses wrecked, 16 others more or less damaged.	Official, U. S. Weather Bureau.
Libertyville, Iowa (near)	28	6 p. m.				do.	Some buildings wrecked.	Do.
Clinton, N. C. (8 miles south of)	28		3,520			Heavy hail.	Severe damage to crops; pigs and poultry killed; path 8 miles long.	Do.
Iowa (northern).	28	P. m.				Hail and wind.	Crops badly injured; buildings damaged.	Do.
Whitney County, Ind.	28	do.			18,500	Wind.	Character of damage not reported.	Do.
Chicago, Ill. (near)	28			27		Wind squall.	Motor boat wrecked, causing loss of 27 lives.	Do.
Isidore, N. Mex.	30	8-11 p. m.	5 mi.			High wind.	Roofs blown off, trees uprooted; windows broken; windmills blown down.	Do.
Logan, N. Mex.	30	10 p. m.	5 mi.		10,000	Tornadic wind and hail.	Crops, buildings, and windmills damaged.	Do.
South Dakota (southwestern).	30		2-8 mi.		80,000	Hail and wind.	Crops a total loss in many places; path 50 miles long.	Do.
Crawford County, Kans. (northwest).	31	6 p. m.	2-3 mi.			Heavy hail.	Considerable damage to property over an area several miles square.	Do.
Wuakomis, Okla.	31	7-7:30 p. m.	4 mi.		10,000	Hail.	Considerable damage to property other than crops.	Do.
Massachusetts (southeastern).	31	7:30 p. m.		1	100,000	Thunderstorm and tornadic wind.	Buildings and trees blown down; communication cut off; much damage by tornadic wind at Rehoboth.	Do.
Adams County, Wash.	31	P. m.				Wind and hail.	Standing wheat sustained a loss of 25 per cent.	Do.
St. John, Wash. (east of)	31	do.			9,000	do.	More than 350 acres of wheat damaged.	Do.

## STORMS AND WEATHER WARNINGS

## WASHINGTON FORECAST DISTRICT

The only storm warnings issued during the month were in connection with a disturbance of considerable intensity that moved northwestward from the vicinity of Bermuda and approached the New Jersey coast during the 2d, after which it diminished in intensity and moved northeastward, its center passing near Nantucket during the 3d. Northeast warnings were displayed in advance of this disturbance from Portsmouth, N. H., to Delaware Breakwater, and small-craft warnings south of Delaware Breakwater to Cape Hatteras. The highest wind velocity reported was 48 miles an hour from the northeast at Nantucket. No other station reported a verifying velocity.

Except for small-craft warnings from Cape Hatteras to Delaware Breakwater on the 4th, no storm or small-craft warnings were issued after the 2d.

Frost warnings were issued for the cranberry bogs of New Jersey and Massachusetts and for the interior of northern New England and the northern portion of eastern New York on the 4th. No frost was reported from any regular reporting station, however, the morning of the 5th.—*C. L. Mitchell.*

## CHICAGO FORECAST DISTRICT

There was nothing unusual in the weather conditions in the Chicago forecast district during the month of July. The temperature averaged somewhat below the normal, and the rainfall, which was mainly in the form of thunderstorms, was rather irregularly distributed.

Warnings for frost on low ground were issued on July 31 for North Dakota and northwestern Minnesota for the ensuing night, and for the cranberry marshes of Wisconsin for the night following; that is, the night of August 1-2. No frosts occurred on the first night, but they appeared to be general in the cranberry marshes on the second.

Small-craft warnings were ordered for the Great Lakes on a few occasions; and any strong winds that occurred were in the form of local squalls.

The only casualty, as far as known, on the Lakes was the capsizing of the small excursion boat *Favorite* on the afternoon of July 28, close to the near-north shore of Chicago, in which 27 lives were lost. The evidence brought out at the inquiry was that the boat was top-heavy and, as the squall broke, all the passengers rushed to the side of the boat away from the wind and rain; and the boat, being out of balance, toppled over. The squall lasted only five minutes, from 2:24 p. m. to 2:29 p. m. (ninetieth meridian time), and attained a maximum velocity of 49 miles an hour at the station on the municipal pier maintained by the water department of the city of Chicago, about 1 mile from the place where the catastrophe occurred. The wind was light to moderate before and after the squall, the total wind movement being only 15 miles in that hour. Thunderstorms had been predicted not only for Chicago and vicinity, but also for Lake Michigan; but no warnings of any kind had been ordered. The wreck of the *Favorite* was the only casualty which occurred, although a vast number of other vessels were exposed to the squall.

A special wind and weather forecast was issued on July 23 for the route of the Chicago-Mackinac Island cruising race which had its start in Chicago on the after-

noon of that date. The forecast issued at that time covered a period of two days, and additional forecasts were issued the following night and morning and broadcast by radio station KYW.

Advices during the month were wired to the California Fruit Growers' Exchange, Los Angeles, Calif., in advance of the development of heat waves in the Chicago forecast district, in order to guide the exchange in the shipping of fruit to this area.

Fire-weather forecasts were resumed for the State and National forests in Minnesota on July 28.

Special flying forecasts were furnished the national air tour for all the points in and bordering on the Chicago forecast district at which these planes stopped. The tour started from Detroit June 27 and returned July 12. The forecasts, as indicated by a number of the flyers, proved highly satisfactory.—*H. J. Cox.*

#### NEW ORLEANS FORECAST DISTRICT

Moderate weather conditions prevailed generally during July. No warnings were issued for the west Gulf coast and no general storm occurred.—*I. M. Cline.*

#### DENVER FORECAST DISTRICT

Frequent disturbances of moderate intensity which advanced eastward from the Rocky Mountain Plateau were attended by the usual summer showers and thunderstorms, especially in the central and northern portions of the district, with an excess of rainfall in Colorado, southeastern Wyoming, and north-central Montana. A marked deficiency in precipitation occurred in most of New Mexico and central and eastern Arizona. While it was cooler than normal over nearly all of the northern portion of the eastern Rocky Mountain slope, the month was generally considerably warmer than the average west of the Continental Divide and in New Mexico.

With the exception of forecasts on the 9th of fresh to brisk westerly winds, and on the 25th of brisk to strong westerly winds, both of which were included in the morning predictions of those dates for Wyoming, no special forecasts or warnings were issued and none was required.—*J. M. Sherier.*

#### SAN FRANCISCO FORECAST DISTRICT

The more important forecasts and warnings related to the fire-weather situation and to the Smith-Bronte airplane flight. The latter took place on the 14th and 15th of the month and required the issuance of special bulletins on the 14th and on several preceding dates descriptive of weather conditions between the mainland and the islands. Careful attention was paid to these advices by the aviators, especially Mr. Bronte, who was in close touch with the Weather Bureau office at San Francisco for a week before the flight. The bulletins were quite successful and received due acknowledgment from the flyers after the completion of their journey, who testified that their chief dependence was on "dead reckoning." Aside from two sextant observations which gave them some idea of their longitude on the morning of the 15th, they were unable to determine their position from celestial observations, and had they not followed a well-conceived compass course and made very accurate allowance for "drift" their adventure might have ended disastrously. This fact earned their appreciation of the weather bulletins from which alone they derived their drift calculations.

It appears that they were exactly on their course until very near the island of Oahu, when, in doubt as to their latitude and fearful of passing the entire archipelago to the north, they departed from their course, turned southward, and crashed on the island of Molokai. Had they continued straight on, instead of turning to the south, they would have landed safely at Wheeler Field, their objective.

The fire situation in the forests grew slowly but steadily more dangerous, but conditions were not acute over the northern parts of the district until the 22d, when a fragment of the North Pacific high pressure system moved inland, bringing excessively high temperatures and low humidities to Oregon and Washington. This situation was anticipated in warnings issued the day before. Others, similar in type, arising in the North Pacific States, called for like bulletins on the 27th and 31st. Warnings of danger from lightning storms were sent to various California forests on 13 occasions, and the attempt at localization achieved some degree of success. On one occasion, viz, the 28th, more than 100 fires were started by lightning in the Klamath, Trinity, Shasta, and Lassen national forests within 48 hours after issuance of the predictions. Thunderstorm warnings were also incorporated on numerous occasions in the State forecasts for Washington, Oregon, Idaho, and Nevada.—*Thomas R. Reed.*

#### RIVERS AND FLOODS

By R. E. SPENCER

The great flood in the Mississippi River finally terminated on July 14, 1927, with the falling of the water below flood stage at Baton Rouge, La.; and by the end of the month the entire lower river was well within the bankful stage. As noted in the special flood bulletin of the New Orleans Weather Bureau office of August 1, 1927, however, considerable areas of swamp bottoms and between 30,000 and 35,000 acres of agricultural land were still inundated. As the recession of water from these areas will depend almost wholly upon absorption and evaporation, it will of course take place very slowly.

The annual rise in the Columbia River, report on which was deferred from the June issue of this REVIEW, occurred substantially as predicted in the Portland, Oreg., snowfall bulletin of April, 1927. It was stated in that bulletin that owing to the snowfall excess in the Columbia drainage basin the crest of the rise would, with the prevalence of normal temperature, be later than and above the average. Relatively cool weather prevailed well into June, and the date of the crest at Portland was 9 days later and 2.9 feet higher than the average. Warnings of the approach of the flood received wide and effective distribution, so that practically no movable property was lost, farmers generally refrained from planting lands that were likely to be flooded, and suspension of business was reduced to a minimum. Incomplete reports of losses due to this flood give the following figures:

Tangible property.....	\$17, 041
Matured crops.....	33, 125
Prospective crops.....	80, 600
Livestock and other movable property.....	500
Suspension of business.....	109, 900
	<hr/> 241, 166

Property valued at \$152,650 was reported saved by the warnings; but the official in charge of the Weather Bureau office at Portland reports that "probably the greatest benefit of the river service this year was in preventing